Roll No. ..... **Total No. of Pages : 02**

Total No. of Questions : 09

B.Tech. (AE) (Sem.–4th)
INTERNAL COMBUSTION ENGINES
Subject Code : AE-202
Paper ID : [A0708]

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY.**
2. **Attempt any FOUR questions from SECTION-B.**
3. **Attempt any TWO questions from SECTION-C.**

SECTION-A (10 × 2 = 20 Marks)

1. Write short notes on :

   (a) Name the two general classes of combustion engine.

   (b) What is an air standard efficiency ?

   (c) State the application of C.I. Engine.

   (d) Write the advantages of induction swirl.

   (e) Define Combustion.

   (f) What do you mean by term 'carburetion'?

   (g) What are the main functions of a nozzle ?

   (h) What are additives ?

   (i) What is supercharging?

   (j) Write the demerits of under cooling.

SECTION-B (4 × 5 = 20 Marks)

2. Explain with suitable sketch the working of a four stroke otto engine.
3. Explain briefly the combustion phenomenon in C.I. engines.
4. What is ignition lag ? Discuss the effect of engine variables on ignition lag.

5. With the help of neat sketch explain the working principle of simple carburettor.

6. A two stroke cycle internal combustion engine has a mean effective pressure of 6 bar. The speed of the engine is 1000 r.p.m. if the diameter of piston and stroke are 110 mm and 140 mm respectively, find the indicated power developed.

SECTION-C (2 × 10 = 20 Marks)

7. Explain the following terms as applied to I.C. Engine:

   (a) Bore (b) Swept Volume

   (c) Stroke (d) Compression Ratio

   (e) T.D.C. (f) Piston Speed

   (g) B.D.C. (h) Clearance Volume

8. Derive expression of efficiency for carnot cycle.

9. An un-supercharged petrol engine develops 735 kW with air fuel ratio 12.8. The bsfc in 0.350 kg/kWh and mechanical efficiency 86%. The inlet pressure is 730 mm of mercury absolute and the mixture temperature is 323 K. The engine is supercharged to a pressure ratio of 1.6 by a supercharger of adiabatic efficiency 0.7 and mechanical efficiency 0.9. Assuming that air fuel ratio remains unchanged and I.P. is proportional to inlet density, calculate the power required to run the supercharger. Assume the volumetric efficiency does not change due to supercharging.